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INFLUENCE OF DIFFERENT DOSES OF GAMMA RADIATION ON THE TOTAL PROTEIN CONTENT (UNITS/G) IN PANCREATIC TISSUE, BLOOD SERUM, AND THE RELATIONSHIP BETWEEN THEM (CORRELATION COEFFICIENT).

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Annotation: This article describes the effect of various doses of gamma radiation on the total protein content in the pancreas and blood serum obtained from rats of the experimental control group.

Keywords: pancreatic tissue, blood serum, total protein, irradiation, grey, dose.

Anotatsiya: Ushbu maqolada tajriba nazorat guruhi kalamushlaridan olingan me’da osti bezi va qon zardobidagi umumiy oqsil miqdoriga turli xil dozadagi gamma nurlanishining ta’siri ifodalangan.

Kalit so‘zlar: me’da osti bezi to‘qimasi, qon zardobi, umumiy oqsil, nurlantirish, grey, doza.

Анотация:В данной статье описывается влияние различных доз гамма-излучения на количество общего белка в поджелудочной железе и сыворотке крови, полученного от крыс экспериментальной контрольной группы.

Ключевые слова: ткань поджелудочной железы, сыворотка крови, общий белок, облучение, грей, доза.

The study of the circulation mechanisms of enzymes of the digestive system, including pancreatic enzymes, is a pressing issue in terms of determining the role of enzymes in the digestive process, as well as the use of biochemical markers in assessing the physiological/pathological functional state of the pancreas. [1; 102-110-p.].

The results of our experiments show that the effect of gamma radiation on the total protein content of pancreatic tissue depends on its dose.

After irradiation at a dose of 1 Gray, the total protein content in the pancreatic tissue decreased by 15% compared to the control group only on the 20th day of the experiment (Fig. 1A). On other days of the experiment, the total protein content remained at the control level, no changes were observed.

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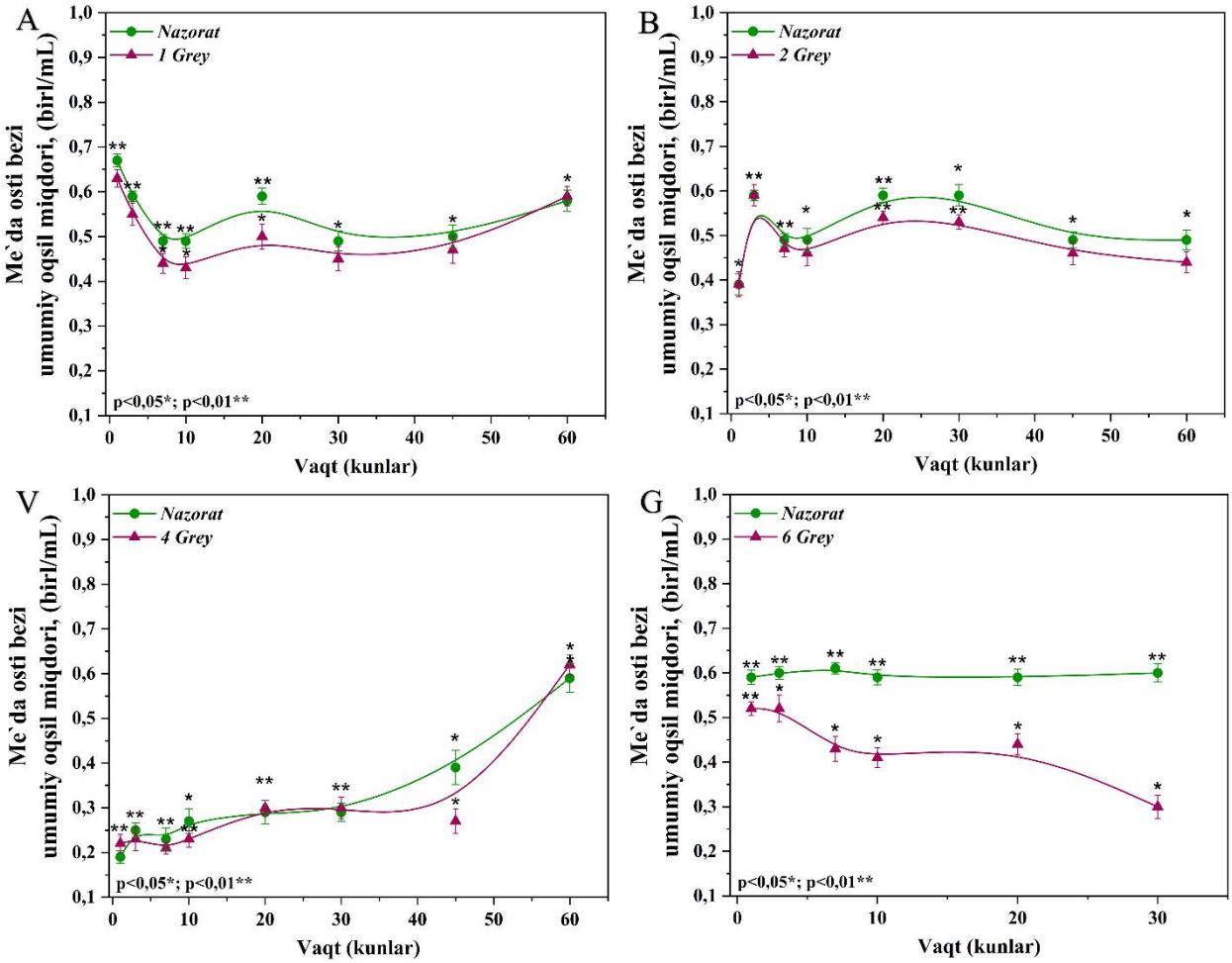

Figure 1. Influence of (A) 1 Gray, (B) 2 Gray, (C) 4 Gray, (G) 6 Gray gamma radiation dose on pancreatic total protein (units/g) (M±m) *P<0,05; **P<0,01; ***P<0,001; n=6.

Irradiation at a dose of 2 Gray did not change the amount of total protein in the pancreatic tissue (Fig. 1B). Even after gamma irradiation at a dose of 4 grams, only on the 10th and 45th days of the experiment did the content of total pancreatic protein significantly decrease, and on the remaining days remained at the level of the control group (Fig. 1V).

When the radiation dose (Fig. 1G) was 6 Gray, the total protein content in the pancreatic tissue decreased by 30% from the 7th day of the experiment compared to the control, and on the 10th and 20th days this indicator shifted slightly towards recovery to the level of the control group (26-27% less than the control). On the 30th day of the experiment, the total protein of pancreatic tissue was 50% compared to the control.

Thus, the total protein content in the pancreatic tissue decreases under the influence of gamma radiation, and this decrease depends on the given dose of gamma radiation, and with increasing dose, the decrease in the total protein content in the tissue is more pronounced.

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All gamma radiation used in the experiment negatively affects the total protein content in blood serum. Gamma radiation at a dose of 1 Gray reduces the total protein content in the blood of experimental animals by 28% the day after irradiation compared to the control group (Fig. 2A). During the experiment, the total protein content in the blood of irradiated animals fluctuated, remaining consistently significantly lower than the indicators of the control group, the lowest indicator was observed on the 30th day of the experiment, on this day the total protein content in the blood decreased by 53% compared to the control, on the 45th and 60th days of the experiment this indicator increased, but did not reach the level before the initial experiment.

The results obtained in rats irradiated with a dose of 2 grams were somewhat different (Fig. 2B). The amount of total protein in the blood of the experimental rats did not change the day after irradiation. From the 3rd day of the experiment, the total protein content in the animals' blood decreased by 12%. On the remaining 7, 10, and 20 days of the experiment, the total protein content in the blood fluctuated slightly and remained reduced. From the 30th day of the experiment, the decrease in total protein content in the blood intensified and by the 60th day of the experiment remained 39% lower than in the control group.

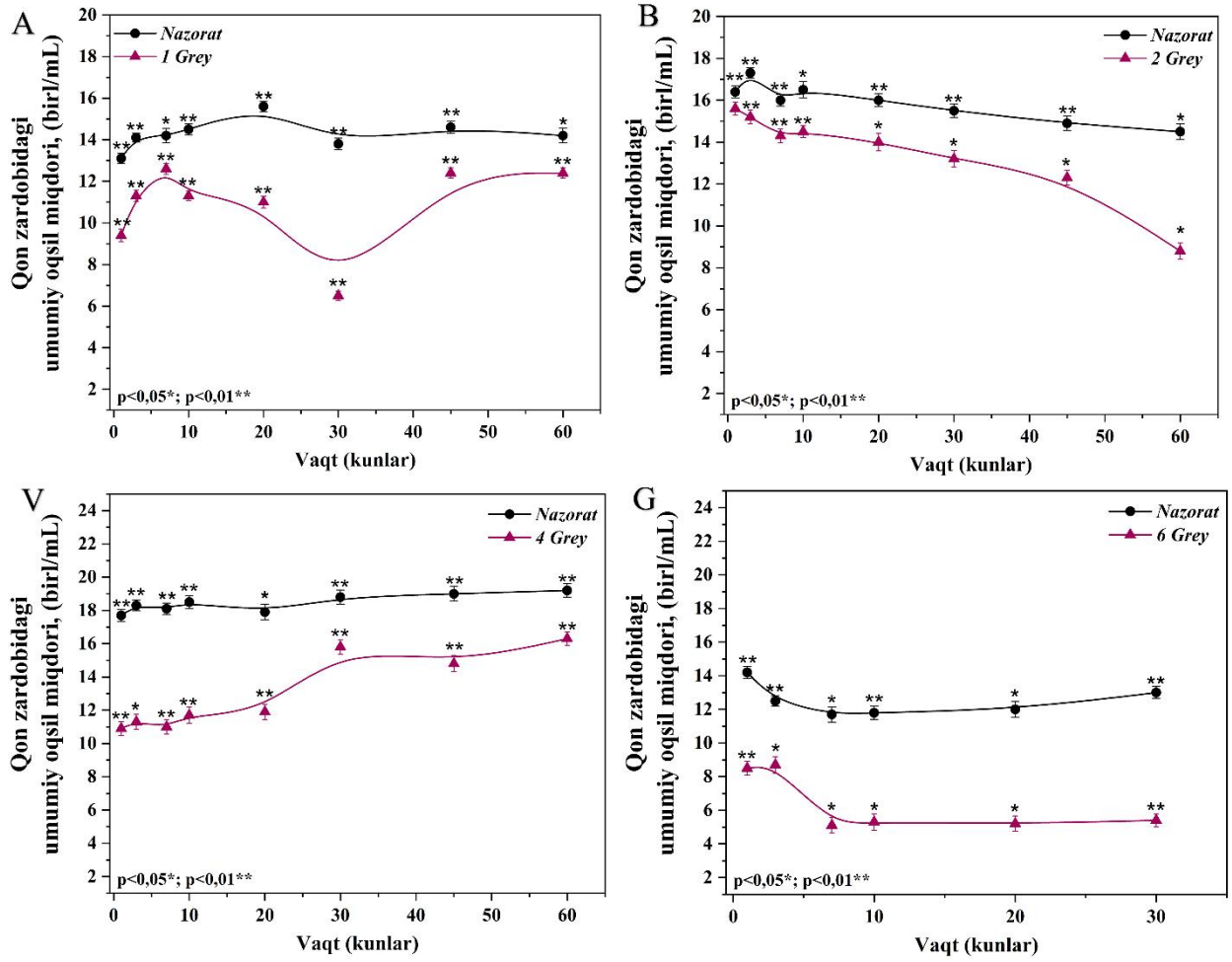

Figure 2. Influence of gamma radiation at doses (A) 1 Gray, (B) 2 Gray, (C) 4 Gray, (G) 6 Gray on the total protein content in blood serum (units/g) *P<0.05; **P<0.01; ***P<0.001; n=6.

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Changes in the total protein content in the blood of rats irradiated with a dose of 4 Gray were also characteristic (Fig. 2B). One day after irradiation, the total protein content in the blood was almost 39% lower than in the control. On the 3rd and 7th days of our observation, the total protein content in the blood remained at this level. In the remaining days of the experiment, the total protein content in the blood increased slightly, but did not reach the level of the control group, and on the 60th day of the experiment, it remained 15% lower than the control.

After irradiation with a dose of 6 Gray, the total protein content in the blood sharply decreased, 40% less than in the control (Fig. 2G). Until the end of the experiment, this indicator fluctuated (57-66% less than in the control) and remained below the control at the end of the experiment.

Thus, gamma radiation at all doses used in the experiment negatively affects the total protein content in the pancreatic tissue and blood, corresponding to the applied dose. With an increase in the dose, a sharp decrease in the amount of total protein in the pancreatic tissue and especially in the blood was observed, which means that with an increase in the dose of gamma radiation, protein synthesis correspondingly decreases.

Protein synthesis in the pancreas occurs at a very high rate. Almost 90% of synthesized proteins consist of enzyme proteins. If calculated as dry matter, acinocytes synthesize 20 mg of enzyme molecules per hour or 7 digits of 10 per minute. In the pancreas, enzymes that hydrolyze all macronutrients are synthesized and excreted in the juice. A certain part of the enzymes synthesized in the pancreas is secreted into the blood. Circulating enzymes in the blood also serve as a depot of digestive glands. When necessary, enzymes can be recreted from the blood into digestive juices, i.e., the recirculation of hydrolytic enzymes occurs.

In addition to enzymes, the blood also contains its own proteins, which are mainly synthesized in the liver and bone marrow, spleen, and lymph nodes. Gamma radiation does not affect all tissues equally. Therefore, we saw a difference in the amount of total proteins in the pancreas and blood, depending on the dose applied under the influence of gamma radiation.

In order to see the degree of correlation between the total protein content in pancreatic tissue and blood serum after various doses of gamma radiation, we studied the correlation coefficient between them. According to the results obtained (Table 1), it can be seen that there is a correlation between the amount of total protein in the glandular tissue and blood, the correlation coefficient is always positive, its lowest value is 0.84, and the highest value is 0.99. We see that with an increase in the dose, this relationship intensifies, that is, a decrease in protein synthesis in the gland tissue leads to a decrease in the total protein content in the blood, which leads to a high correlation coefficient between them.

Table 1.

Correlation coefficient of the dependence of the total protein content in pancreatic tissue and blood serum after exposure to gamma radiation of varying doses

	1 Grey	2 Grey	4 Grey	6 Grey
1 day, n=6	0,92	0,90	0,94	0,84

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3 day, n =6	0,94	0,92	0,94	0,89
7 day, n =6	0,91	0,90	0,92	0,89
10 day, n =6	0,95	0,89	0,88	0,92
20 day, n =6	0,94	0,90	0,89	0,87
30 day, n =6	0,96	0,86	0,93	0,89
45 day, n =6	0,91	0,91	0,91	-
60 day, n =6	0,95	0,87	0,90	-

Under the influence of gamma radiation, the total protein content in the pancreatic tissue and blood decreased proportionally to the dose, which indicates a decrease in protein synthesis under the influence of this radiation.

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